

several departments the services of specially qualified writers, and will occupy for some time to come a high position as a work of reference for Biblical questions. As, however, it affords willing hospitality to the representatives of the most advanced criticism, it will be interesting in the course of a few years as a standard of comparison to show how far these opinions have been able to hold their own. Discussions of this kind occupy a large space even in geographical and historical articles and sometimes make it difficult to extricate physical facts from the maze of contradictory opinions. But these, when found, are clearly and accurately stated, as in the article "Trachonitis," which, however, is merely one of the more conspicuous of a large group. The maps also are a marked characteristic of the whole work—numerous, excellent of their kind, having in many cases contour lines and tints to indicate heights above and below sea level. That, for instance, which includes Trachonitis gives an excellent idea of the physical geography from north of Hermon to south of Pella in the Jordan valley. The short article on "Tabor" also is an admirable epitome of a place interesting both geographically and historically. That on "Tarshish" is a learned discussion on the identification of the place. In that on "Stones (Precious)" we find an almost exhaustive summary of what is known or conjectured about the gems of ancient times, with remarks on those in the high priest's breast-plate and the foundations of the vision city. The articles on natural history are not seldom from at least two contributors, one supplying the scientific the other the historical information. For the former, as under the word "Serpent," Mr. Shipley is responsible, so that we are sure of being on safe ground, while the other contributor adds much curious folklore. Indeed, the frequent references to this are not the least valuable part of the "Encyclopædia." Sir W. Thiselton-Dyer has contributed to the botanical articles, such as the "Vine," in this volume; that also on "Wine and Strong Drinks" is full of interesting information. Many of the theological and critical conclusions, as implied above, will doubtless be disputed, but as a compendium of information on history, archæology, geography, and all kindred topics the "Encyclopædia" is most valuable.

T. G. B.

Country Rambles: a Field Naturalist's and Country Lover's Note Book for a Year. By W. Percival Westell. Pp. xvi+312+xxxvi. (London: Henry J. Drane, 1903.) Price 10s. 6d.

MR. WESTELL has made a serious mistake; he has let himself become the slave of his note-book. He seems to have made up his mind to write a year's diary for publication, with the result that he has filled it with trivialities which after a few pages will weary the reader, be he naturalist or not. On almost every page we find entries such as the following, which are taken quite at random:—"February 2. The snow will act as a deterrent on the singing of our feathered musicians, although I have often heard Robin and Wren singing in the very depth of winter, evidently cheered by the transient gleam." "March 21. I was tempted out into the garden early by the brilliant sunshine, and did a bit of gardening. Chaffinch 'pinkings.' How delicate-looking the first Snowdrop as it peeps through the brown earth!" "June 10 (among other similar entries). What a variety of small beetles cross the path of the ramble, like dark little jewels darting about in the sunlight! There are many hairy caterpillars too. Cannot they move at a rate! How they curl up into the ball of protection!" No wonder that we read on the same page, "How often the Note-book comes out at this

season!" Mr. Westell's mind has been working more upon his note-book than upon nature, and he would do well to leave it behind him for some time to come, and to reconstruct his ideas of observation and of a naturalist's work. When he touches a difficult or doubtful problem, he shows us at once what manner of naturalist he is. On p. 125 we read that "an instance is recorded by Herr Muller (*sic*), a well-known German Naturalist, of a Cuckoo sitting on, and hatching, her own fledgling. Three Cuckoo's eggs were found by Herr Muller in a hollow under a tussock of grass, &c." This statement seems to be taken from Dr. Japp's book on the Cuckoo; the Herr Muller is Adolf Müller, the forester; the occurrence he described, though, of course, in itself not impossible, has not been accepted by ornithologists whose opinions at any rate deserve some consideration, e.g. Prof. Newton, Mr. A. H. Evans, and Mr. Howard Saunders. Yet Mr. Westell retails this as a proved but extraordinary fact, without making the least attempt either to test the truth of it himself by going to the original source, or to collect the opinions of scientific naturalists on an alleged zoological fact of such great importance. He has to learn that there are other qualifications for a naturalist besides the constant companionship of a note-book and a binocular glass. We are very far from wishing to discourage the proper use of these, or the intelligent enjoyment and observation of nature, but what we cannot possibly encourage is the publication of bulky and expensive volumes like this (weighted, too, by photographs, only some of which are really excellent), which cannot satisfy the real naturalist or even the ordinary reader; and in this we are sorry to disagree with Mr. F. G. Aflalo, who has written a kindly preface to the book. It is to be hoped that Mr. Westell's love of the country and of nature will in the course of time be turned to better account.

Text-book of Organic Chemistry. By Prof. A. F. Holleman, translated by A. Jamieson Walker. Pp. xxvii+555. (New York: Wiley and Sons; London: Chapman and Hall, Ltd., 1903.) Price 10s. 6d. net.

A SHORT time ago an English translation of Holleman's "Inorganic Chemistry" was welcomed by chemists in this country. The translation of the organic part has followed with commendable promptitude. This book is one of the best on organic chemistry which it has been our lot to read. Prof. Holleman approaches his subject with a freshness and vigour of style which make it delightful reading. Furthermore, he is not bound down by precedent or prejudice, and therefore follows no stereotyped style.

The book is written upon theoretical lines, and for this reason Prof. Holleman does not, as a rule, enter into descriptive details of manufacturing processes, and he only occasionally, as, e.g., in the case of iodoform, describes even laboratory methods for preparing substances. This we consider is a good feature of the work—not that methods of preparation on a large scale should be neglected in teaching chemistry, but there are already many books which give more or less accurate details of manufacturing processes. And as for methods of laboratory preparation, these should be taught in the laboratory. Again, if the student is well grounded in his theory, as he should be if he carefully studies this book, he is less likely to look upon methods of preparation as if they were so many cookery receipts.

The book naturally falls under two heads, the aliphatic and the aromatic compounds. The aliphatic part is certainly more complete than the aromatic, which latter, considering that it contains, beside hydrocarbons of the benzene and naphthalene series, the terpenes, heterocyclic compounds such as pyrrole, furfuran, &c., and the albumens, is shorter than we should have

expected. The subject, however, is treated very concisely and generally very clearly. There is rather a want of lucidity, however, in his treatment of the synthesis of indigo on p. 512. The chapter on the diazo-compounds and the short *résumé* of Hantzsch's work in this direction are very good, and his remarks upon the electro-reduction of nitro compounds are also excellent.

Prof. Holleman pays particular attention to the physico-chemical side of the subject, an aspect which has been neglected by most writers of books on organic chemistry. On p. 188, for example, in the chapter upon polybasic acids, he devotes a long paragraph to their physical and chemical properties; again, on p. 196, he gives a clear explanation of the electro-synthesis of dibasic and other acids, while on p. 334 he describes Tafel's fine work on the electro-reduction of purine derivatives. In fact, one of the chief values of the work is the welding together of physical and organic chemistry.

The book is hardly suitable for beginners or for students who *want* (we will not say *require*) just a smattering of organic chemistry, but for the earnest student of the subject the work is one which can be most highly recommended. The style is good, the method of arrangement is excellent, and we think that there are few who will lay down the book after having studied it and feel disappointed.

Messrs. Wiley have produced the book in excellent style, and have spaced out the formulæ and equations in a lavish manner. Truly science knows no nationality—the book is written by a Hollander, translated by a Scotchman, and published by an American house.

F. M. P.

Education in Accordance with Natural Law. Suggestions for the Consideration of Parents, Teachers, and Social Reformers. By Charles B. Ingham. Pp. xi+125. (London: Novello and Co., Ltd.; New York: Novello, Ewer and Co., n.d.) Price 3s. net.

EVER since the publication of Rousseau's "Émile," with its well-known opening sentence, "Tout est bien sortant des mains de l'Auteur des choses, tout dégénère entre les mains de l'homme," there have been writers reflecting more or less satisfactorily the illuminating ray which Jean Jacques directed against the educational formalism of his day. Of course, if educational methods contravene the laws of nature, good results cannot be expected; but it is of supreme importance that writers venturing to define and formulate a system of education in conformity with natural law should at least first make sure that they understand the broad generalisations they call to their aid. An examination of Mr. Ingham's arguments gives rise to the suspicion that he has not completely mastered the conclusions at which men of science have arrived, and that his acquaintance with physical science is scarcely intimate. But Mr. Ingham is an experienced teacher, and has many sensible pieces of advice to offer, and even if the truths he advances are not new, they certainly are not universally adopted yet. To mention a few points on which the author has sound views is alone possible here. He advocates earnestly the need for more scientific methods in education; he pleads for more leisure time for boys and girls, in which they may follow their own devices; and he inveighs against the unsatisfactory early training of girls. He has not, we think, given science a sufficiently important place in the education of young people, but there can be little doubt that if parents could be persuaded to read the book they would have a clearer idea of what the aim of education should be.

A. T. S.

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LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Psychophysical Interaction.

I AM interested by the letter of the professor of philosophy in the University of Birmingham on p. 126, and if your readers are not weary of the discussion—as I see no reason why they should be, since it is clearly a difficult question which must be discussed from time to time as science advances—I should like to add a few words.

When Prof. Muirhead says that my recent contention was advocated by Descartes, he is stating what is of interest, but what I did not know; I was not aware that the idea of energy, or even of momentum, was sufficiently clear in his era. But however this may be, he must not think that I regard the statement "that mind cannot produce energy" as axiomatic. It is a question not of axiom, but of fact. It seems to me that live things *do not* generate energy and *do* direct it; so I assert this, not as a necessity of thought, nor as an idea for which I have a special predilection, but simply as an experience. If Descartes maintained the same thesis, so much the more likely is it to be true.

Inert matter—all matter is inert—matter devoid of life then let us say, moves (technically, is accelerated) when and because it is pushed from behind. Live matter moves or is impelled to move from other motives; it is urged by anticipation of the future sometimes, by gratification of appetite for instance, or by avoidance of pain, often. A typical case is a costermonger's vehicle propelled by a bunch of carrots, or by the blows of a stick applied in indiscriminate profusion. There is nothing like that in storm or cataract or tide; nor is there anything like it in motor-car or railway-train, unless we include in the machinery the mind of the engineer.

Prof. Muirhead recommends a pacification of the question in the ultimate *nirvana* of idealistic monism. I am disposed to acquiesce ultimately in this destination, but I feel that there is something more proximate to be attained first. Philosophers go so fast and so far, they do not give the scientific man a chance; he wants to study the landscape and grub by the roadside. The ultimate outlook is doubtless there, very fine and attractive, like the setting sun; but the traveller to the west has much to see and much to do, and a constant gaze too far ahead may only dazzle him and unfit him for his proper work on the terrestrial sphere.

OLIVER LODGE.

Oxford, June 12.

THE opponents are not getting into close quarters. Dr. Hobson was irreproachable, but the others are using the word "force" all through the discussion, although it is the most unhappy word anyone could use in a controversy about fundamental physical conceptions. Its object is to enable us to contemplate one aspect of an action while we dismiss the other absolutely from our minds, because, when we want to give all our attention to one of the two bodies concerned, it helps us to ignore the other as much as possible.

It is remarkable also that Prof. Minchin should write that "guiding or deviating forces," if they allow the universe to keep its total energy intact, "infallibly alter its total momentum." Prof. Ward seems to have said the same thing, and the curious error remains without specific contradiction. Yet anyone who remembers that if there are n particles in the universe, there are $3n$ velocities for a sprite to amuse himself by tinkering with, will agree that he must, indeed, be a stupid or self-willed sprite who could not arrange to keep Σmv^2 , $\Sigma m\dot{x}$, $\Sigma m\dot{y}$, and $\Sigma m\dot{z}$ unchanged while he disported himself with variations of the other $3n-4$ integrals.

Though that is merely a mistake on a side issue, an example on it will serve to put clearly the two different points of view. Suppose that there are two bodies of equal mass $2m$ moving due north with velocities of 9 and 1